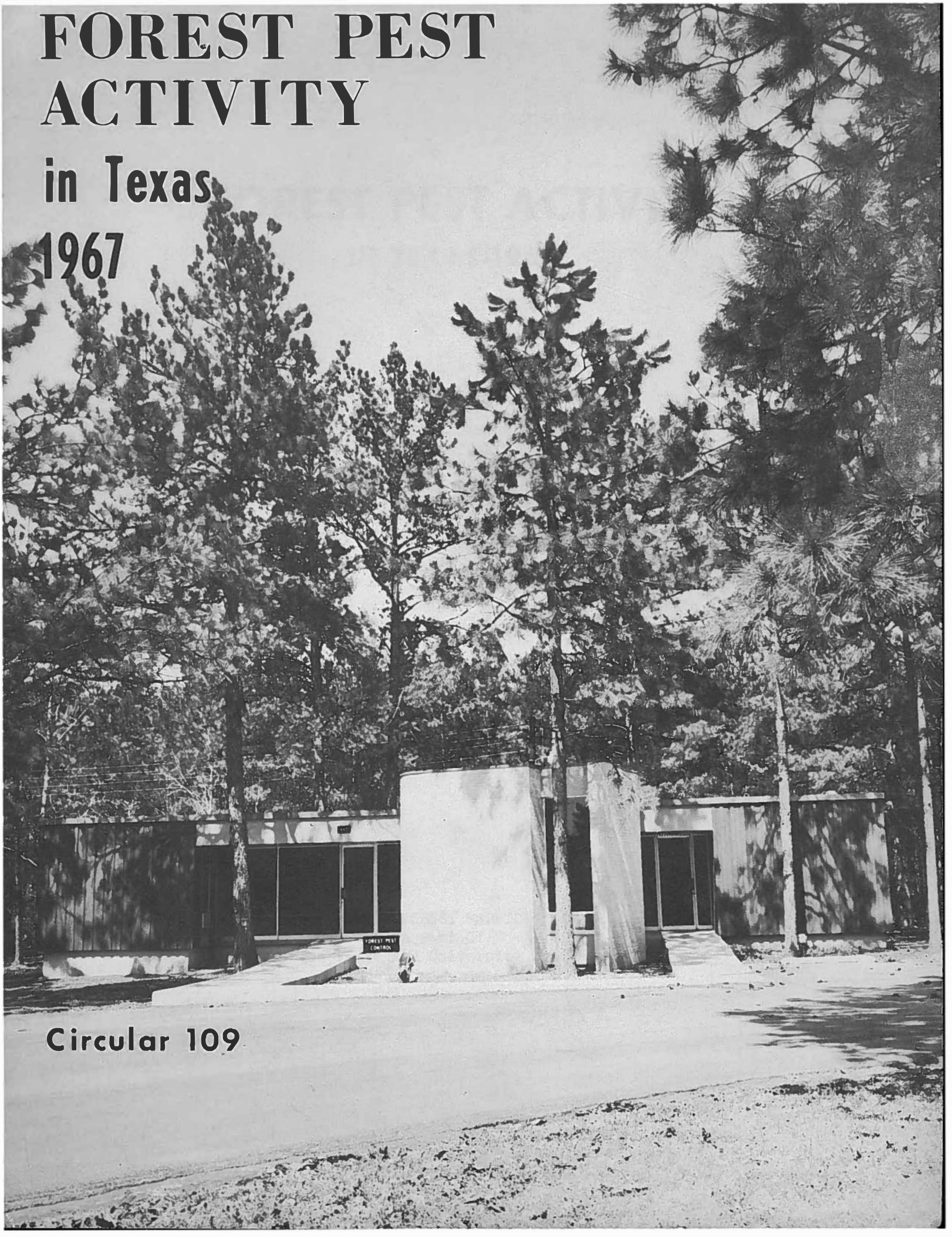
FOREST PEST ACTIVITY in Texas 1967



Circular 109

FOREST PEST ACTIVITY

IN TEXAS-1967

by
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Private Forest Industry
U. S. Forest Service
Texas Agricultural Extension Service
and
Texas Agricultural Experiment Station
Cooperating

TEXAS FOREST SERVICE
A Part Of
The Texas A&M University System

SUMMARY

Texas forest landowners battled the Southern pine beetle for the eleventh consecutive year in 1967. Approximately $400,000 were spent to chemically treat and/or utilize 133,000 beetle infested trees. The outbreak encompassed 4.5 million acres of southeast Texas.

More than 3,000 pounds of Mirex 450 ant bait and 36 cases of methyl bromide were used in 12 east Texas counties to control Texas leaf cutting ant colonies on 16,700 acres.

The deodar weevil population built to serious proportions during the fall of 1967 and killed more than 50 percent of the pine reproduction in small localized areas.

COVER: The new Forest Pest Control building in the Cudlipp Forestry Center at Lufkin, completed in July, 1967.

FOREST PEST ACTIVITY IN TEXAS-1967

INTRODUCTION

Pests have had a great impact on Texas' forests. An impact which has long been unchallenged particularly with regard to the Southern pine beetle. A more positive attitude toward the use of beetle killed timber for pulpwood and sawlogs remains paramount. Trees in many beetle infestations are unfeasible to utilize and must be controlled by the 20-year-old recommendation of spraying the bark with benzene hexachloride and fuel oil. Spiraling labor costs make chemical control more expensive each year. Control costs will be lowered if research organizations, such as the U. S. Forest Service Experiment Station and the Southern Forest Research Institute at Sour Lake, Texas, can improve control techniques.

This condensed report of Texas forest pest activity and control efforts in 1967 includes forest insects, forest diseases and animal pests. Compilation, publication and dissemination of this report is for the benefit of all Texas landowners and especially for cooperators and the Texas Forest Pest Committee.

INSECTS

SOUTHERN PINE BEETLE Dendroctonus frontalis - Southern pine beetles continued to ravage pine stands over southeast Texas in 1967 for the eleventh consecutive year. Infestations were distributed over 4.5 million acres which included all or portions of 16 counties (Figure 1). Small forest landowners, forest products industries, other companies, and the state and federal forest service's combined to suppress the outbreaks.

The Texas Forest Service served as coordinator of the Southern pine beetle control project. Supervisory assistance was supplied by the Sub-Committee on Field Control of the Texas Forest Pest Committee. Sector flights by forest industry foresters and the Texas Forest Service commenced in February, after a January evaluation survey showed 4.0 Southern pine beetle infested trees per thousand acres, and continued on a two-week schedule until mid-October when beetle activity subsided (Table 1).

The monthly totals are conservative in that spots detected by the U. S. Forest Service are not included nor are those spots found and controlled by ground crews. The 3221 spots detected compare with 3172 for 1966.

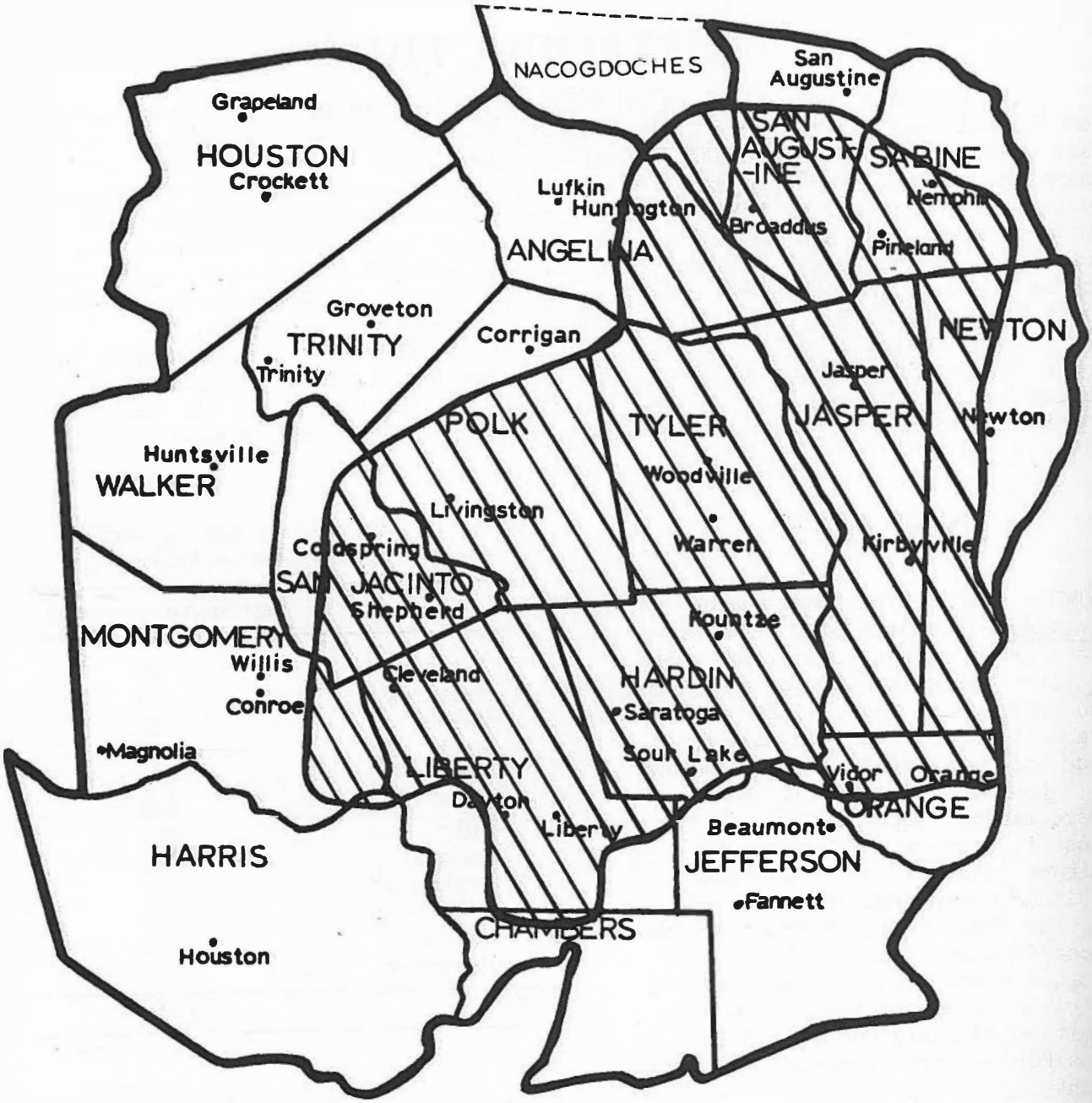
Table 1. Spots Detected by Aerial Observation - 1967.

Month	New Spots Detected
January	12
February	70
March	93
April	336
May	1009
June	869
July	475
August	223
September	103
October	31
November	0
December	0
TOTAL	3221

Landowners used two methods to suppress Southern pine beetle infestations: brood tree utilization and/or chemical treatment with a mixture of benezene hexachloride and fuel oil (Figure 2). Year-end reports from all landowners reveal approximately 133,000 trees treated and/or utilized.

Figure 1.

AREA OF SOUTHERN PINE BEETLE INFESTATION



SOUTHEAST TEXAS

LEGEND

Infestation area

1967

Table 2. Pine Timber Killed by the Southern Pine Beetle in Southeast Texas from 1957 - 1967.

Year	Sawlogs	Pulpwood	Total
	M. bd. ft.	cds.	M cu. ft.*
1957	no record	no record	no record
1958	500	0	84
1959	2,500	2,500	598
1960	8,000	8,000	1,912
1961	17,887	24,000	4,715
1962	93,043	111,110	23,538
1963	4,084	1,920	820
1964	2,501	1,420	520
1965	3,797	7,743	1,192
1966	6,256	6,930	1,544
1967	7,194	8,566	1,818
TOTAL	145,755	172,189	36,741

*Conversion factors: 167 cu. ft./M bd. ft. and 72 cu. ft./cd.

These year-end reports show 7.2 million board feet of sawtimber killed of which 2.1 million was utilized. The reports also indicate that the Southern pine beetle killed pine timber on more than 200 infested spots which totaled 1360 acres. A resume of losses in past years is given in Table 2.

The combined expense to all landowners for the 1967 Southern pine beetle control project was $400,000.

The Texas Forest Pest Law, passed in 1963 and involked in 1965, was again used in 1967 to control 75 infestations which recalcitrant landowners refused to control. A total of 311 spots was controlled by the State for which cost of control was paid by landowners.

BLACK TURPENTINE BEETLE Dendroctonus terebrans - Populations of these beetles build up in Texas in recently logged sites, especially in sites located in the flatwoods. Drought periods, in the summer and fall of 1967, may have dried the bottomlands enough to help keep down the beetle population.

Control action against the black turpentine beetle took place on the Texas National Forests in Angelina, Houston, Jasper, Montgomery, Sabine, San Augustine, Trinity and Walker Counties and on private land in Orange County. Approximately 2500 trees were sprayed with a mixture of benzene hexachloride and fuel oil. Many sprayed trees were located around campsites. Dead and dying pines were salvaged whenever possible.

ENGRAVER BEETLES Ips avulsus, grandicollis and calligraphus - Ips populations remained relatively low during the first half of 1967 but increased quickly during the early summer drought. Very little precipitation fell during the summer and fall months and many low vigor trees were killed by the beetles. Populations remained high into the fall and winter months. Recently logged sites and overstocked plantations were heavily attacked as well as pines on deep sandy soils. One-half acre kills were reported on plantations in Smith and Tyler Counties.

DEODAR WEEVIL Pissodes nemorensis - A dry summer and fall apparently helped this minor forest pest to overpower loblolly and shortleaf pine reproduction. Adult feeding alone killed up to 50 percent of the reproduction in localized areas in Jasper,

San Augustine, Trinity and Tyler Counties by October and November. Weevil feeding was observed throughout East Texas. Most mortality occurred to trees under 15 feet in height; however, visual damage symptoms were observed on trees up to 25 feet tall. Larvae develop well in the lower bole of large Ips attacked pines (Figure 3).

Adults eat the tender bark and, when numerous, can girdle a tree. Needles have a scorched appearance with the outer one-half of their length turning brown and curling. Continued heavy attacks can cause death. Several areas exhibited mortality to the uppermost branch terminals. These probably occurred in localities less heavily populated by the weevil. At a distance, top killing is easily confused with tip moth damage.

No control programs were undertaken in 1967 but the pest will be kept under close observation by the Texas Forest Service.

TEXAS LEAF CUTTING ANT Atta texana - This ant colonizes on well-drained sandy soils throughout East Texas. Workers cut green vegetation for their fungus gardens, which grow and are fed upon, below ground. Damage becomes a problem during the winter months in new pine plantations because other green foliage is scarce (Figure 4). High seedling mortality results in infested plantations unless control measures precede planting. Natural reproduction is also killed. Pine saplings are attacked as well but their larger crowns and ability to grow new needles lessens their chances of mortality.

The control of Texas leaf cutting ants ranks as the second most expensive measure for forest landowners in Texas. In 1967, landowners used more than 3000 pounds of Mirex 450 pelleted bait and 36 cases of methyl bromide to control ants on 16,700 acres. The insecticide was applied in Cherokee, Hardin, Houston, Jasper, Montgomery, Nacogdoches, Newton, Sabine, San Augustine, Shelby, Tyler and Walker Counties.

Recommended applications are first made whenever damage is observed or about one month prior to planting. A second treatment, 2-4 years later, is sometimes required to allow the stand to grow beyond the potential damage period.

NANTUCKET PINE TIP MOTH Rhyacionia frustrana - These moths infest the terminal and lateral shoots of young loblolly slash and shortleaf pines in Texas. The pest causes damage to natural and planted forests throughout the range of pine in East Texas and to ornamental pines in many urban areas of the state.

Tip moth activity was moderate throughout East Texas in 1967. No heavy infestations were reported. The most recent heavy infestation was noted on a loblolly plantation in Trinity County in 1965.

Tip moths damaged genetically superior loblolly pines in several experimental plots, established by the Texas Forest Service. Twelve acres of these pines were treated with 10 percent Thimet granules in 1967. Control was excellent when two ounces of granules per inch of stem diameter at the ground were raked into the soil. Application was made in February. Gas masks, gloves and slickers were worn by workers during the application. Thimet is extremely toxic and not recommended for general use.

CONE INSECTS - The majority of insect damage in all orchards was caused by the coneworm, Dioryctria amatella. Seedworms, Laspeyresia spp., have been collected from loblolly cones but damage was low. Cone production from genetically superior trees in Texas Forest Service seed orchards suffered from insect attack in 1967. Loss of loblolly pine cones reached 50 percent at the Arthur Temple, Sr. Seed Orchard. Fifteen percent of the conelets and 35 percent of the cones were killed. These losses occurred despite monthly mist blower applications of water-carried benezene hexachloride. Slash pine cone losses have never been high and this was true in 1967 when less than 5 percent of the crop was destroyed.

Figure 2. Treatment of a Southern pine beetle infested tree with a mixture of BHC and fuel oil.

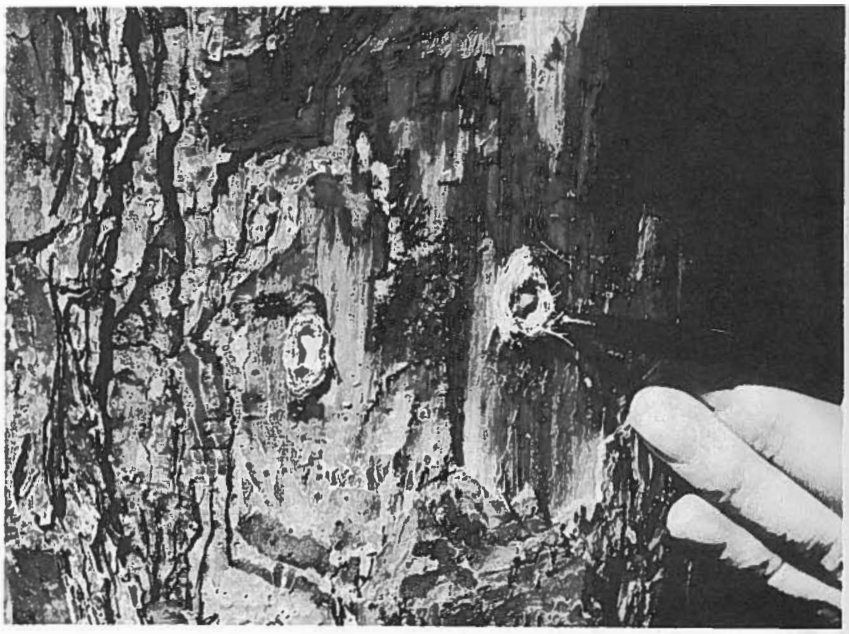


Figure 3. Weevil larvae under bark in chip cocoons.

Figure 4. A site that was cleared and burned before planting. It contains a large population of Texas leaf cutting ants.

Figure 6. Western pine beetle galleries on ponderosa pine.

Figure 5. One-year-old cottonwood severely damaged by the cottonwood twig borer.

SAWFLIES Neodiprion spp. - Defoliation characterizes the work of sawfly larvae which feed on pine needles and reduce them to mere stubs. After heavy attack, trees exhibit thin crowns which slow the growth and can cause mortality.

A buildup of Neodiprion excitans on 17,600 acres in Hardin County in 1958 continued into 1959; however, an aerial spray program using one pound DDT per acre suppressed the outbreak. There were no reports of sawfly outbreaks in 1967, although a 3000-acre tract of pines in Polk County was damaged in 1966.

WESTERN PINE BEETLE Dendroctonus brevicomis - A survey of West Texas timberlands in October revealed a light outbreak of western pine beetle on private land. Ponderosa pine Pinus ponderosa was found dead and dying on Black Mountain, in the Davis Mountain chain, around the 7000 foot level (Figure 7). The western pine beetle and Southern pine beetle are closely related and both construct similar egg galleries (Figure 6). Numerous pockets of ponderosa snags on adjacent mountains indicate this pest has been more active in past years.

COTTONWOOD INSECTS - Cottonwood plantations were established in Texas, in 1963, and insects immediately became a problem. Nursery cutting stock was heavily attacked by a multitude of insect pests. The clearwing moth, Paranthrene dollii, and the leaf beetle, Chrysomela scripta, were especially destructive. Two-year-old cottonwood plantings on 1600 acres in Liberty and Montgomery Counties, were heavily attacked in 1965 and 1966 by C. scripta. Aerial applications of Malathion and Dieldrin in late spring prevented further losses. Older plantations were only lightly infested in 1967.

Attacks to nursery stock were thwarted successfully in 1967 by a side application of 10 percent granular Thimet. A fertilizer distributor was used to apply the side dressing and a trailing sweep covered the insecticide with two inches of soil. Thirteen acres containing 11,000 cottonwood root stocks each were treated with 200 pounds of 10 percent Thimet per acre. The only damage noticed was a negligible amount of infestation by clearwing larvae.

A one-year-old cottonwood plantation in Brazos County was heavily hit in 1967 (Figure 5). Numerous attacks by P. dollii, and the cottonwood twig borer, Gypsonoma haimbachiana, weakened or killed most branch tips and caused severe crown deformation and loss of height growth. Insecticides were not applied.

PINE TUBE MOTHS Argyrotaenia - Entomologists from the U. S. Forest Service, Albuquerque, New Mexico, received a call from Park Officials and visited Big Bend National Park. They found a budworm complex attacking Douglas-fir Pseudotsuga menziesii var. glauca, and Mexican pinyon pine, P. cembroides. The infestation was in the interbasin area of the Chisos Mountains. Two species of Argyrotaenia, both probably new species, were found. Another budworm Choristoneura houstonana also was collected in the interbasin area on Mexican pinyon pine.

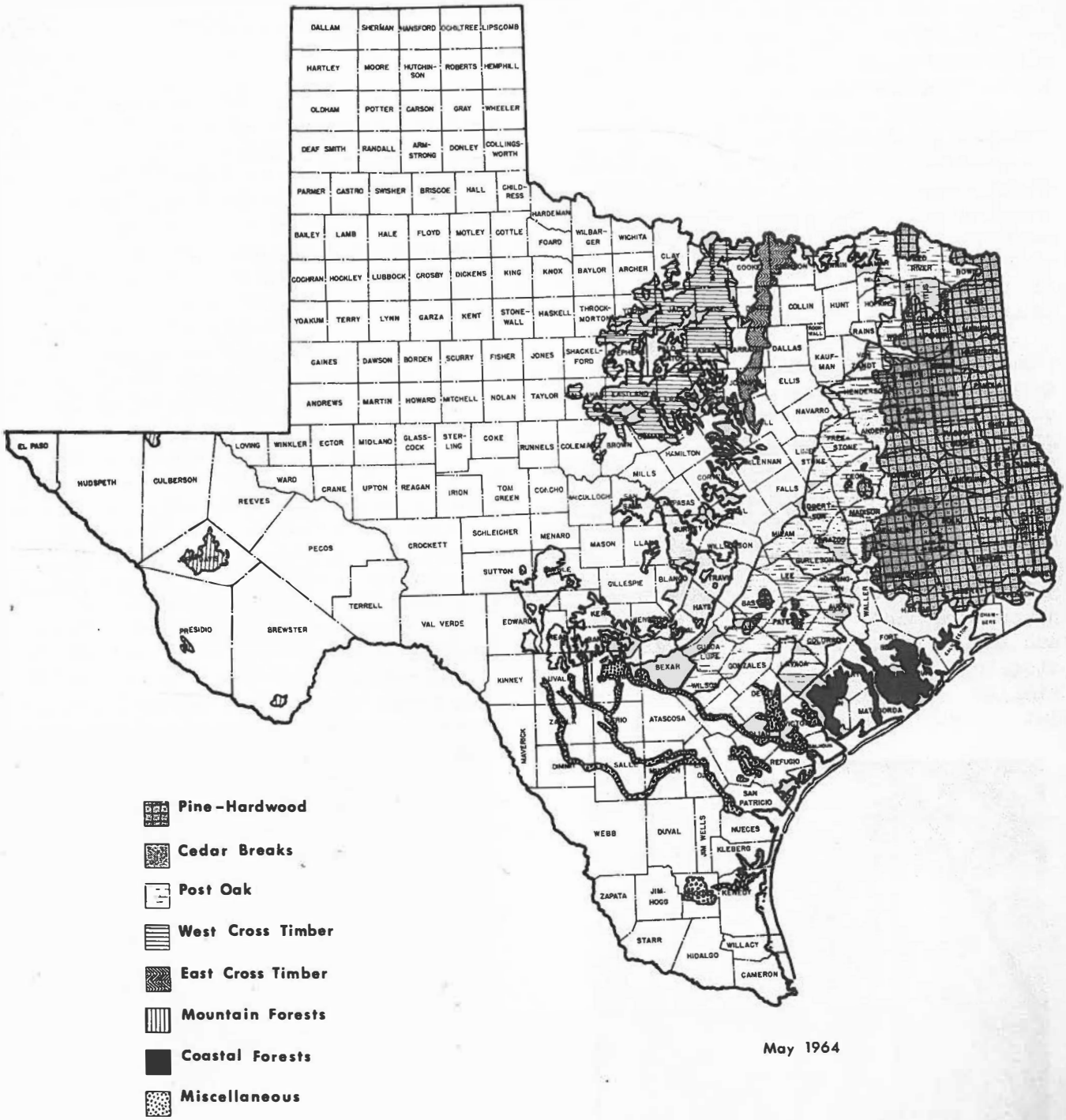
The biologies of the complex are unknown and no control was recommended.

FLANNEL MOTH Megalopyga - A light outbreak of flannel moths in the McKittrick Canyon area of the Guadalupe Mountains was reported by the U. S. Forest Service, Albuquerque, New Mexico. McKittrick Canyon is located immediately south of the Texas-New Mexico border and is a proposed national park site. Minor feeding was observed on oak Quercus sp., madrone Arbutus texana and mountain maple Acer grandidentatum during the summer.

The biology of this pest is unknown and no control action was recommended.

Figure 7

TREE REGIONS OF TEXAS



DISEASES

ANNOSUS ROOT ROT Fomes annosus - The most outstanding forest disease in East Texas is annosus root rot, caused by the fungus Fomes annosus. Numerous reports have been received from throughout the Texas host range on all four pine species, with slash and loblolly pine most affected.

A survey to evaluate the location, severity of damage, and rate of spread on selected sites is planned for 1968. Observations suggest a greater occurrence in northeast Texas than in the southeastern portion. Should the survey confirm these observations, an attempt will be made to determine the causes for such variance.

Observations also reveal an apparent "dying out" of the disease on several sites, moderate mortality on others, with severe mortality being present on only a few sites. The pathogen appears to have become inactive on certain sites 5 to 10 years after mortality was first noted, with abundant natural pine reproduction filling the opening. Examinations of 3-to 7-year-old reproduction revealed no outward signs of re-infection nor additional mortality in the original stocking. It is not believed that similar conditions are common throughout the southeastern United States.

Figure 8. A typical Fomes annosus infection center. The characteristic opening in the stand is surrounded by dead, dying and apparently healthy trees.

The situation may be a result of environmental factors characteristic only of the western extremity of the Southern yellow pine range.

There is no known control, but prevention recommendations are described in TFS Circular 97, Fomes Annosus Root Rot in Texas.

FUSIFORM RUST Cronartium fusiforme - Fusiform rust, caused by the fungus Cronartium fusiforme is one of the most damaging diseases of Southern pine forests. The rust has been reported in all portions of the east Texas pine belt, but has not reached concerning portions in any section. Greatest incidence is on slash and loblolly pines. One 15-year-old loblolly pine plantation in Jasper County supports a 45 percent stem infection. Most infections, however are restricted to branches on an occasional tree.

Infection of planting stock in the Texas Forest Service Indian Mound Nursery is prevented by applying a solution of 5 pounds of Fermate per 150 gallons of water. Applications are scheduled every 7 to 10 days for a 10-week period. Spraying is initiated in early April, with the first liberation of teliospores, and continued through the danger period until late June. About 8 acres, or 7 3/4 million loblolly, slash and shortleaf seedlings were treated in 1967.

Recommended control of forest infections is by silvicultural means, whereby infected trees are removed during thinning operations.

DUTCH ELM DISEASE Ceratocystis ulmi - A survey of this dread virus disease of elm trees, which is transmitted by the smaller European elm bark beetle (Scolytus multistriatus Marsh.), indicated the disease probably has not entered Texas. The survey covered most of the upper High and Rolling Plains and was conducted by area plant pathologist, Dr. Robert Berry and the survey entomologist. Since the beetles have been well distributed in Texas for several years, and since the disease has been found in Oklahoma, Dutch elm disease could enter the state

at any time. Any elm tree dying unexplainably in this area of the state should be thoroughly investigated.[1]

CYTOSPORA CANKER OF COTTONWOOD Cytospora sp. - Numerous cankers, produced by a member of the genus Cytospora, were noted in 1- to 10-year-old cottonwood plantings in Brazos County and at the Indian Mound Nursery in Cherokee County. The disease appears as lesions or cankers on trunks and large limbs of affected trees. Small branches and twigs are usually killed before a definite canker forms. The disease enters the tree through wounds or dead limbs. Pruning should be avoided, particularly on poor, dry sites where the hazard of infection is greatest.

Successful, disease free plantations depend largely on maintaining vigorous growth of the planted stock. Care should be exercised in choosing suitable sites. Healthy planting stock, not less than 1/4 inch in diameter, should be obtained and planted immediately after the site has been cleared to avoid competition with undesirable species.

CHEPHALOSPORIAM DECLINE OF OAK Cephalosporium sp. - A decline of live oak Quercus virginiana was first reported near Austin, Texas, in 1933. Since that time, additional isolations have been made from declining Southern red oak Q. falcata, water oak, Q. nigra and post oak Q. stellata.

Symptoms include leaf necrosis which begins at the leaf margin and progresses toward the midrib, leaf shedding, followed by twig dieback and tillering on the main stem. Infected heartwood often exhibits a brown discoloration and faint acetate odor. A canvass of county agricultural agents by the Texas Agricultural Experiment Station in 1966 revealed the presence of the disease throughout the range of live oak in Texas (approximately 90 counties in Central and East Texas). Indications are, however, that it is a "social" disease with greater concentrations in metropolitan than forested areas. Exact distribution and severity is difficult to assess due to the spotty occurrence of live oak throughout its range.

OAK WILT Ceratocystis fagacearum - Oak Wilt, caused by the fungus Ceratocystis fagacerum, presents a continuing threat to all oak species in the United States. Positive identification of the fungus in Texas was first made in Dallas County, in 1961. Since that time, two surveys have been conducted to evaluate the seriousness and extent of infection. The 1964 survey showed oak wilt to be evenly distributed in Dallas County, usually in single-tree infection centers. An exception is the southern portion of metropolitan Dallas where slightly heavier concentrations were observed. No infection was found in the 1966 survey in northeast Texas.

Oak wilt has been found only in Texas oak, Quercus shumardii var. texana. This may be due to the great number of Texas oaks planted in the Dallas area. Periodic surveys will be continued to maintain a check on future conditions.

There is no known control for oak wilt, though infected trees in many areas are often cut and burned in an attempt to prevent further spread of the disease.

TYMPANIS CANKER Tympanis sp. - A species of Tympanis was observed causing "flagging" of branch tips on 15- to 20-year-old loblolly pines and top dieback of 3- to 5-year old loblolly pine seedlings, in Tyler County, Texas in late summer. The fungus was identified on 5 of approximately 50 samples collected in late October. Canker characteristics and great abundance appear to be directly associated with insect feeding. Feeding habits and scar patterns produced on pine by the deodar weevil, P. nemorensis, are strikingly similar in appearance to the observed cankers. Several fresh feeding wounds have been marked for observation to determine if there is an association between late winter adult weevil feeding and Tympanis can-

[1] Texas Cooperative Economic Insect Report-July 21, 1967.

kers. If such a relationship is confirmed, an abundance of cankers can be expected in late 1968, stemming from an unusually active winter population of the deodar weevil.

DWARFMISTLETOE Arceuthobium vaginatum - Parasitism by southwestern dwarfmistletoe Arceuthobium vaginatum, was observed on ponderosa pine in the Guadalupe Mountains of West Texas. Damage was primarily in the form of stunted or deformed crowns, with reproduction especially affected. Stunting and deformities are often a result of numerous witches'-brooms in the lower crown or of scattered infections throughout the tree. Such attacks are capable of starving the tree, resulting in death.

As yet, there is no known chemical which can kill the parasite without damaging the host. Where individual values permit, as in parks and lawns, control must be initiated when the tree is young. Control consists of pruning branches as they are attacked. In timber production areas where this practice is impractical, control must be incorporated into management and silvicultural practices by specifying the removal of parasitized trees during cutting operations.

NEEDLE CAST OF PINE - The term needle cast is frequently used to describe a dieback and premature shedding of pine needles. Needle cast may be caused by one of several fungi and is rarely of economic importance, although an occasional tree which is repeatedly attacked may exhibit a significant decrease in growth or eventually die.

The months of November and December revealed unusually heavy needle cast. Slash, longleaf and loblolly pines were attacked, exhibiting a typical needle browning and "scorched" appearance.

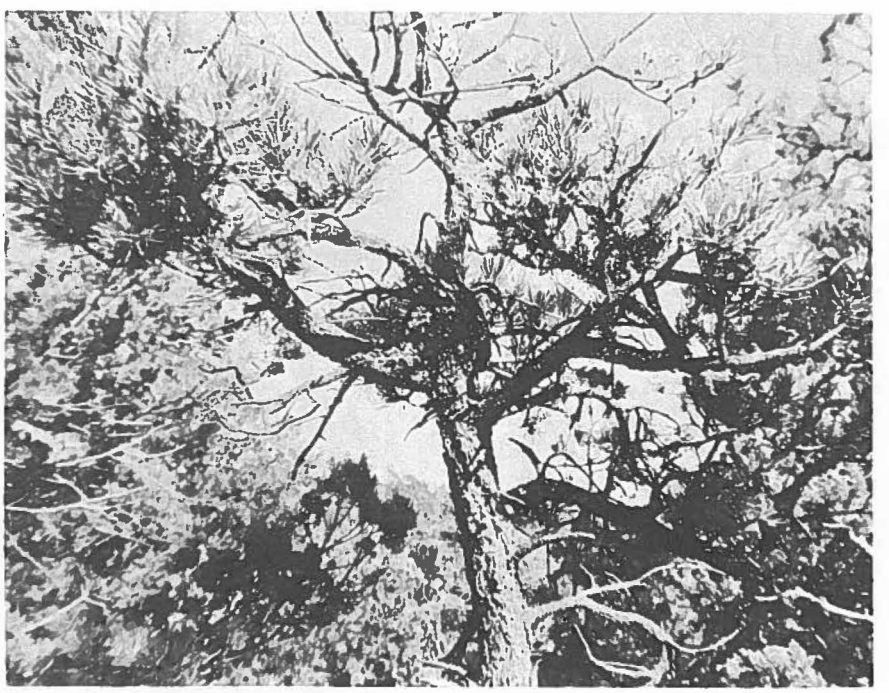


Figure 9. Deformities and witches'-brooms on a ponderosa pine produced by dwarfmistletoe.

ANIMALS

BEAVER Castor canadensis - Complaints, voiced by landowners in Polk County, against beavers revealed the flooding of approximately 250 acres of forest land. Most damage was confined to Menard Creek and its drainages. Water release, through dam destruction and use of pipes, has given poor results. The use of traps in other Southern states has given the best results. Beavers are apparently on the increase in Texas and landowners should concentrate their control efforts on the trapping methods available.

Beaver damage does not result so much from what they eat but from what they mess up. Only a small number of trees are dropped and these mainly a alongside streams. However, many trees are inundated, often at great distances from the stream and are eventually killed by the water. Flooded pines die first and are followed by the hardwoods. All mortality is confined to the highly fertile bottomlands.

WHITETAILED DEER Odocoileus virginianus - Genetically superior grafted slash pine saplings on the W. Goodrich Jones State Forest near Conroe have been killed by deer. The damage was the result of bucks rubbing the velvet from their horns on the sapling stems in August and September. Approximately 5 percent of the saplings were stripped of branches and bark in the 14-acre plantation.

Deer are protected in the 1700-acre state forest and are well supplied with good browse. The slash plantation is one of the few openings in the forest and receives regular fertilizer treatment. The Service plans to fence the plantation.

Where deer populations are high, they will consume small pine seedlings and browse pines as high as they can reach. They also browse on desirable hardwood reproduction in bottomlands.

PORCUPINE Erethizon dorsatum - Many trees in the mountains of West Texas were found gnawed by porcupines in an October survey. Damage occurred frequently on young ponderosa pines from mid-bole upward and on larger limbs (Figure 10). Pinyon pine P. edulis and Ashe juniper Juniperus ashei also displayed porcupine damage. Some of the small trees, which were attacked, had fading crowns.

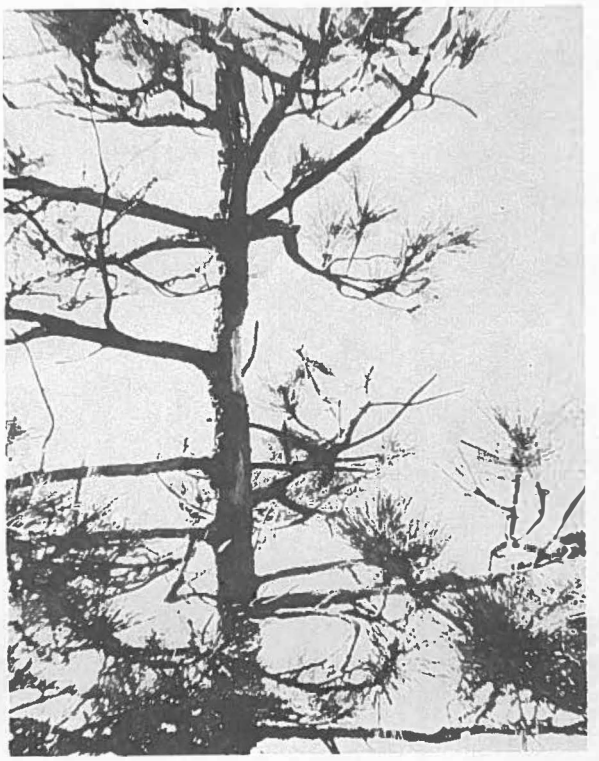


Figure 10. Porcupine damage to a ponderosa pine in the Davis Mountains in West Texas.

OTHERS

SULFUR DIOXIDE - Defoliation of loblolly pine occurred in Cass County, Texas, as a result of a high concentration of sulfur dioxide fumes within one-fourth-mile radius of producing gas wells. Numerous trees were defoliated more than once, generally recovering without visual signs of deterioration. Occurrence is unpredictable as weather conditions fluctuate, providing for concentrated gas settlement in the immediate vicinity.